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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/036,999
Filing Date: December 21, 2001
Appellant(s): DORSEL ET AL.

Bret Field
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 29 November 2005 appealing from the Office action mailed 18 August 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner. The rejection of Claims 1, 5, 7, 10 and 11 under 35 U.S.C. 103(a) over Lehman in view of Brower are withdrawn in view of Appellant's comments on pages 7-8 of the brief.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

No evidence is relied upon by the examiner in the rejection of the claims under appeal.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-5, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bengtsson (U.S. Patent No. 6,078,390, filed 4 May 1998) in view of Rava et al (U.S. Patent No. 5,874,219, filed 9 April 1996).

Regarding Claim 1, Bengtsson teaches a method comprising: scanning an interrogating light across multiple sites on an array package wherein the scanned sites include multiple

features of the array (Fig. 2); detecting signals from respective scanned sites emitted in response to the interrogating light (Column 5, lines 28-40); and decreasing the interrogating light power for a first site (e.g. calibration area, Column 6, lines 23-30), on the array package during the array scanning (Column 8, lines 11-17). Bengtsson specifically teaches low-power scanning during calibration of a calibration area, which is "preferably" a "portion of the microarray....the area may be selected by drawing a box around the area" (Column 6, lines 26-30). The selected portion, as described by Bengtsson, is physically distinct (i.e. "a portion") from the remaining portions of the microarray. Bengtsson further teaches the scanning light across a first line of the calibration area and decreasing power of the light (Claim 1, (B-D)). The first line is physically outside the remaining lines of the calibration area and/or array.

Bengtsson teaches the method wherein the multiple sites on the array are elements arranged in the commonly known microarray (Column 5, lines 28-31) but they do not specifically teach their microarray includes an addressable array of multiple features of different moieties. However, microarray including an addressable array of multiple features of different moieties were well known in the art at the time the claimed invention was made as taught by Rava et al (Abstract). Rava et al teach a similar method comprising: scanning an interrogating light across multiple sites on an array package which scanned sites include multiple features of the array; detecting signals from respective scanned sites emitted in response to the interrogating light (Column 5, lines40-56) wherein the array includes an addressable array of multiple features of different moieties (Column 2, lines 35-42) and wherein the method provides for high throughput assays thereby improving efficiency of assay performance (Column 4, lines 33-40).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the addressable multiple feature arrays of Rava et al to the microarray detection of Bengtsson to thereby detect high throughput assays for the expected

benefit of improving efficiency of assay performance as taught by Rava et al (Column 4, lines 33-40).

Regarding Claim 2, Bengtsson teaches the method wherein the interrogating light power is reduced based on a determination that the emitted signal would exceed a predetermined value (Column 2, lines 22-39 and Column 6, lines 44-64).

Regarding Claim 3, Bengtsson teaches the method wherein the interrogating light power is increased based on a determination that the emitted signal will be below a predetermined value (Column 2, lines 22-39 and Column 6, lines 44-64)

Regarding Claim 4, Bengtsson teach the method wherein the determination is based on the emitted signal detected from the first site (Column 6, lines 23-29).

Regarding Claim 5, Bengtsson teach a method comprising scanning interrogating light across multiple sites of an array detecting signal from respective scanned sites emitted in response to the light and altering the power of the interrogating light for a first site which is an array feature and wherein interrogating light power is altered based on the signal emitted from the first site when the light initially illuminates the first site (i.e. scan line 301 is scanned, attenuation is adjusted (power decreased) to avoid saturation, Column 5, lines 43-47 and Column 49-64). The claim is drawn to altering light power during scanning. The scanning method of Bengtsson as illustrated in Fig. 3 encompasses scanning of multiple lines/rows. Bengtsson specifically teaches altering power "automatically and iteratively" during the scanning operation (Column 7, line 61-Column 8, line 5). Furthermore, Bengtsson specifically teaches use of a power modulator that turns off, for a fraction of dot scanning (Column 8, lines 14-18). Hence, in response to illumination of a dot, the system adjusts power by turning power off.

Regarding Claim 18, Bengtsson teaches a method comprising scanning an interrogating light across multiples sites on an array package (microarray), detecting signals from scanned sites emitted in response to interrogating light and altering power of interrogating light (using

power modulator) for a first site during array scanning based location of the site (i.e. for each dot (location) in the scan, the system turns off the laser) thereby power is altered during a row scan of the interrogating light (Column 8, lines 11-23).

Regarding Claim 19, Bengtsson et al teaches the method the microarray is arranged in rows (Fig. 2 and Column 28-40). Furthermore, Rava provide motivation for providing microarray having the row arrangement i.e. instrumentations exists for handing and reading this format and hence using the known format does not require extensive re-engineering (Column 8, lines 51-56 and Column 10, lines 40-44). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the row arrangement of Rava et al to the microarray of Bengtsson et al based on the advantages taught by Rava et al i.e. instrumentations exists for handing and reading this format and hence using the known format does not require extensive re-engineering (Column 8, lines 51-56).

Regarding Claim 20, Bengtsson teaches line by line scanning (Fig. 3) which clearly suggests row by row scanning and Rava et al teach that technology exists for reading microarrays arranged in rows (Column 10, lines 40-44). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to read the microarray of Bengtsson by scanning row by row as they suggest based on the availability of technologies for reading microarrays arranged in row format as taught by Rava (Column 10, lines 40-44).

Response to Arguments

Appellant argues that Bengtsson teaches the calibration area within the array and not outside as instantly claimed. The argument has been considered but is not found persuasive because, as stated above, Bengtsson specifically teaches scanning during calibration of a calibration area, which is "preferably" a "portion of the microarray....the area may be selected by drawing a box around the area" (Column 6, lines 26-30). The selected portion, as described by Bengtsson, is physically distinct from the remaining portions of the microarray. Furthermore, the claim is drawn to a "first site outside **an** area occupied by the array". The

array as described by Bengtsson comprises at least two areas i.e. the calibration area and the non-calibration area. The calibration area is outside the non-calibration area of the array. Therefore, the calibration area is outside "an area of the array" as claimed. Bengtsson further teaches the scanning light across a first line of the calibration area and decreasing power of the light (Claim 1, (B-D)). The first line calibration area is physically outside the remaining lines of the array.

Appellant asserts that Claim 5 is drawn to adjusting light power during the process of scanning a line based on a single from a site upon initial illumination. Appellant acknowledges that Bengtsson adjusts the power of the interrogating light, but argues that Bengtsson only adjusts the light after completion of scanning an entire scan line. The argument has been considered but is not found persuasive. Bengtsson specifically teaches use of a power modulator that "turn the lasers 1 and 14 off for some fraction of the time that the systems is scanning across a scan line" and that "turns off the lasers for a fraction of the scanning of each element of dot" (Column 8, lines 11-18). Additionally, Bengtsson teaches that data is collected from the dots (Column 5, lines 28-31). Hence, Bengtsson specifically teaches that data is collected from the dots and power is adjusted during a row scan.

Appellant asserts that because Bengtsson teaches the system "need not have determined the locations" that this provides evidence that the power is not altered based on detected signal. This recitation that the system "need not" suggests that the system can work without detecting the locations. However, the recitation also states that the detection is not necessary "as long as the width or diameters of the elements are known". In other words, if the width and diameters are not known, the system requires spot detection for calibration.

Claims 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bengtsson (U.S. Patent No. 6,078,390, filed 4 May 1998) in view of Rava et al (U.S. Patent No. 5,874,219, filed 9 April 1996) and Lehman et al (U.S. Patent No. 5,237,172, issued 17 August 1993).

Regarding Claim 7, Bengtsson teaches a method comprising: calibrating an interrogating light power versus a control signal characteristic from a light system which provides the interrogating light of a power which varies in response to the control signal characteristic; scanning an interrogating light across multiple sites on an array package which scanned sites include multiple features of the array; detecting signals from respective scanned sites emitted in response to the interrogating light; and altering the interrogating light power for a first site on the array package during the scanning step (Column 8, lines 11-23) based on location of the first site or on a determination that the emitted signal from the first site will be outside a predetermined range absent the altering (Column 6, line 1-Column 7, line 60).

Bengtsson also teaches "power modulator 500 that controls laser excitation sources 12a and 14a to essentially turn the lasers 12 and 14 off for some fraction of the time that the system is scanning across a scan line. Hence, the system turns off the lasers for a fraction of time during the row scanning (Column 8, lines 12-18).

Bengtsson teaches the method wherein the multiple sites on the array are elements arranged in the commonly known microarray (Column 5, lines 28-31) but they do not specifically teach their microarray includes an addressable array of multiple features of different moieties. However, microarray including an addressable array of multiple features of different moieties were well known in the art at the time the claimed invention was made as taught by Rava et al (Abstract). Rava et al teach a similar method comprising: scanning an interrogating light across multiple sites on an array package which scanned sites include multiple features of the array; detecting signals from respective scanned sites emitted in response to the interrogating light (Column 5, lines40-56) wherein the array includes an addressable array of multiple features of different moieties (Column 2, lines 35-42) and wherein

the method provides for high throughput assays thereby improving efficiency of assay performance (Column 4, lines 33-40).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the addressable multiple feature arrays of Rava et al to the microarray scanning of Bengtsson to thereby scan and detect high throughput assays for the expected benefit of improving efficiency of assay performance as taught by Rava et al (Column 4, lines 33-40).

Bengtsson and Rava do not teach a step of pre-calibration prior to scanning. However, Lehman et al teach a similar method comprising pre-calibration performed prior to scanning their array wherein the pre-calibration coupled with calibration during the scan (dynamic calibration) provides optimized data collection at a throughput rate determined by the maximum rate of scanning (Abstract). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the pre-calibration step of Lehman et al to the calibration method of Bengtsson for the expected benefit of providing optimized data collection at a rate equal to maximum rate of scanning as taught by Lehman (Abstract).

Regarding Claim 8, Bengtsson teach the method wherein a microarray is scanned (Column 5, liens 27-67 but they do not teach that their scanning is repeated for each of multiple array packages. However, Rava et al teach the similar method wherein multiple arrays are scanned (Column 4, lines 24-30 and Column 5, lines 40-56)) and wherein the method provides for high throughput assays thereby improving efficiency of assay performance (Column 4, lines 33-40).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the multiple array scanning of Rava et al to the microarray scanning of Bengtsson to thereby scan and detect high throughput assays for the expected benefit of improving efficiency of assay performance as taught by Rava et al (Column 4, lines 33-40).

Regarding Claim 9, Bengtsson teaches the method wherein the light system includes a light source and an optical attenuator through which light from the source passes to provide the interrogating light and wherein the control signal comprises a signal from the optical attenuator which provides a variable attenuation in response to the characteristic of the control (Column 3, line 32-Column 4, line 7).

Regarding Claim 10, Bengtsson teaches the method wherein the interrogating light power is reduced based on a determination that the emitted signal would exceed a predetermined value (Column 2, lines 22-39 and Column 6, lines 44-64).

Regarding Claim 11, Bengtsson teach the method wherein the determination is based on the emitted signal detected from the first site (Column 6, lines 23-43).

Response to Arguments

Appellant reasserts that Bengtsson does not teach power alteration during a row scan as required by the independent claims. The argument has been considered but is not found persuasive because as stated above, Bengtsson teaches "power modulator 500 that controls laser excitation sources 12a and 14a to essentially turn the lasers 12 and 14 off for some fraction of the time that the system is scanning across a scan line. Appellant asserts that Rava and Lehman fail to cure the deficiencies of Bengtsson. The argument has been considered but is not found persuasive for the reasons provided above regarding Bengtsson.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

BJ FORMAN, PH.D.
PRIMARY EXAMINER

Respectfully submitted,

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